Space Weather Forecast

Issued on Sunday, 21 November 2021 at 00:38 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight Chance of Minor Geomagnetic Storm G1 at first, otherwise no significant activity.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was very low over the last 24 hours, with no significant X-ray flare activity. There are two sunspot regions on the sun at present, which are both small, stable and magnetically unipolar (a relatively inert set of traits).

A large but faint 'filament' (arc of plasma) gradually disappeared from the northern solar hemisphere meridian during the UTC afternoon on extreme UV satellite imagery, also very faintly visible on ground-based telescopes roughly between 20/1200 and 1600UTC. There is not yet any evidence of any resulting Coronal Mass Ejection (CMEs) on satellite imagery.

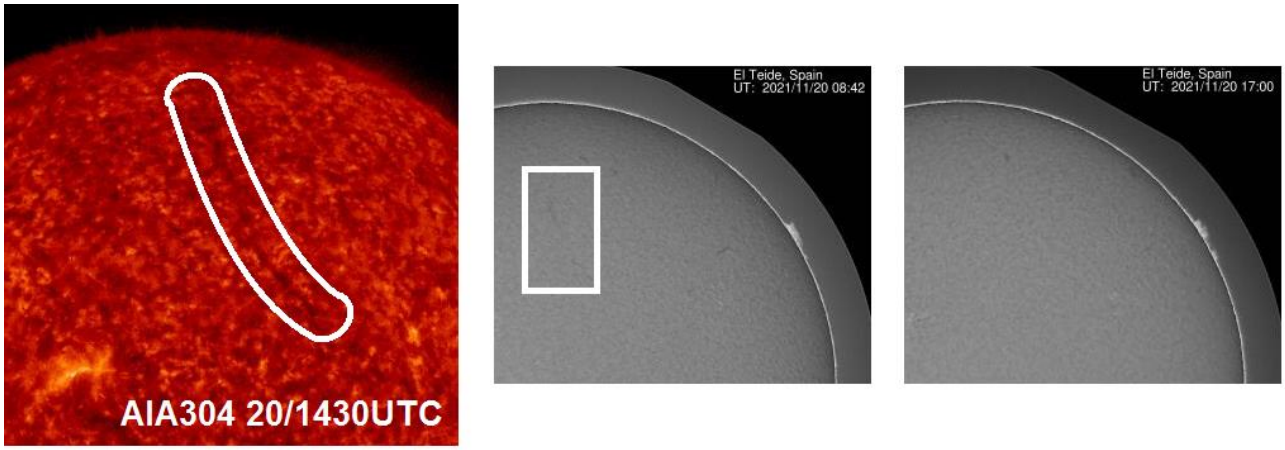

Figure 1: (Red) False-colour extreme UV satellite imagery of a filament shortly before its disappearance during the UTC after of Saturday (compare the ground-based observatory images in greyscale before and after the event). There is not yet any evidence that this has left the immediate solar environment, although this is being monitored.

In addition to this event, there was a possible 'prominence eruption' from narrowly behind the northeastern solar horizon around 20/0600UTC, with the ejecta not Earthbound. Finally, a CME became visible during the UTC evening. The attribution for this event is not yet certain, however it may be far-sided (over the western solar horizon) to give no effect at Earth. Should thoughts on this change, updates will follow in future guidance.

Regarding other noteworthy features, there are currently two other large filaments in the southeastern quarter of the sun, however these appear to be stable at the time of writing. No Earth-directed Coronal Mass Ejections (CMEs) have been observed in available imagery.

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Solar Wind / Geomagnetic Activity: The solar wind became elevated in the period as a result of connection to a 'coronal hole' in the UTC of Saturday 20 November. In addition to the increase in solar wind speed, the magnitude of the magnetic field associated with the solar wind increased, although only a little above background and only briefly, while the number of particles themselves remained fairly constant.

The result of the above solar wind measures was mainly quiet geomagnetic activity - well below Minor Geomagnetic Storm G1 throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be very low, with a daily 10% chance of common-class flares.

Solar Wind / Geomagnetic Activity: No Earth-directed CMEs feature in the current four-day forecast.

Earth's interaction with the current fast wind is likely to be the peak of activity for the period, with a now reduced slight chance of Minor Geomagnetic Storm G1 - should any prolonged period of magnetically anti-aligned solar wind materialise (versus Earth's field), although this should become less likely with time. The new working week UTC should see a resumption of a slow solar wind environment, with geomagnetic activity correspondingly falling to quiet.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	5	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	1	1	1	1
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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